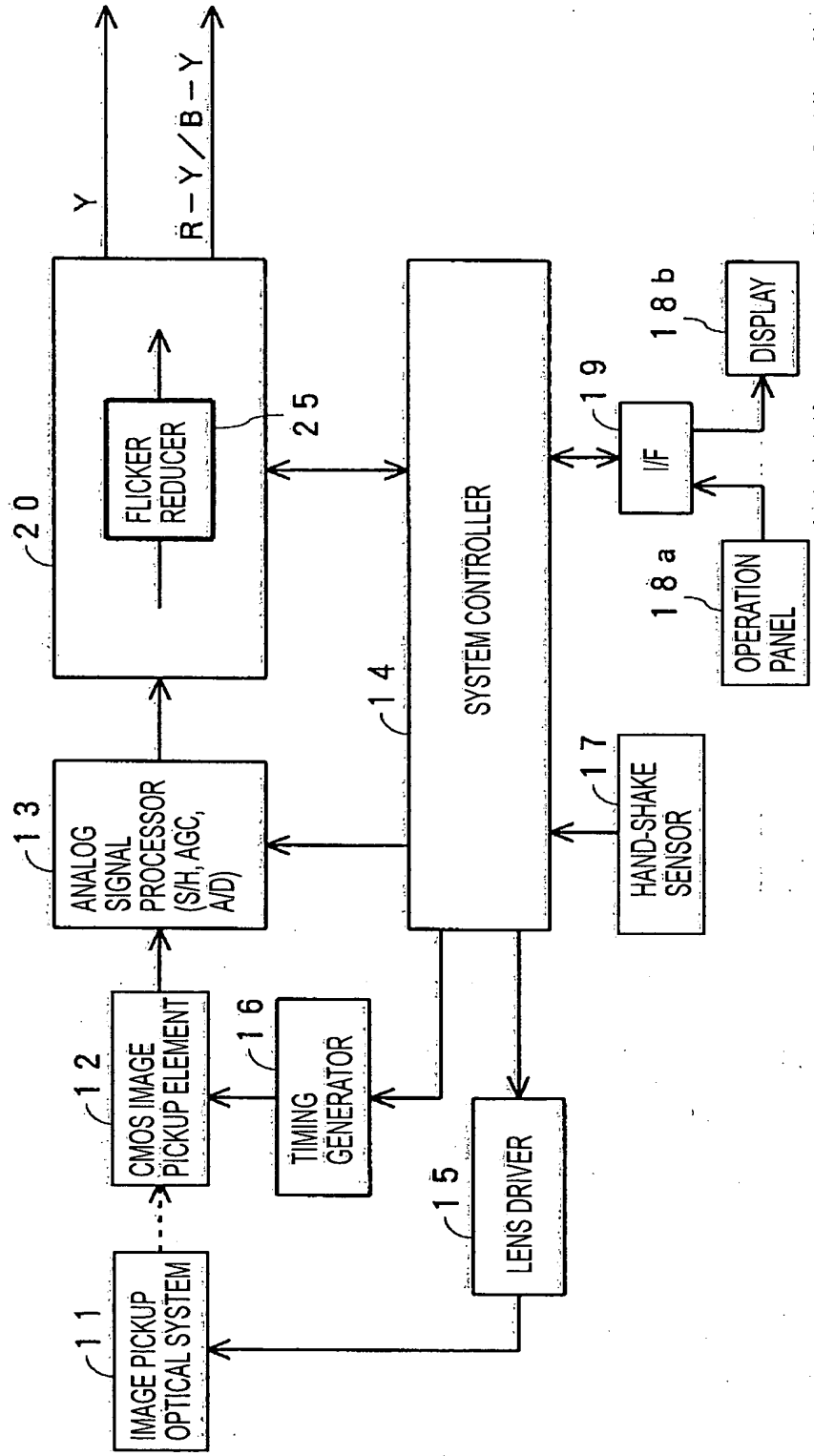


Fig.1

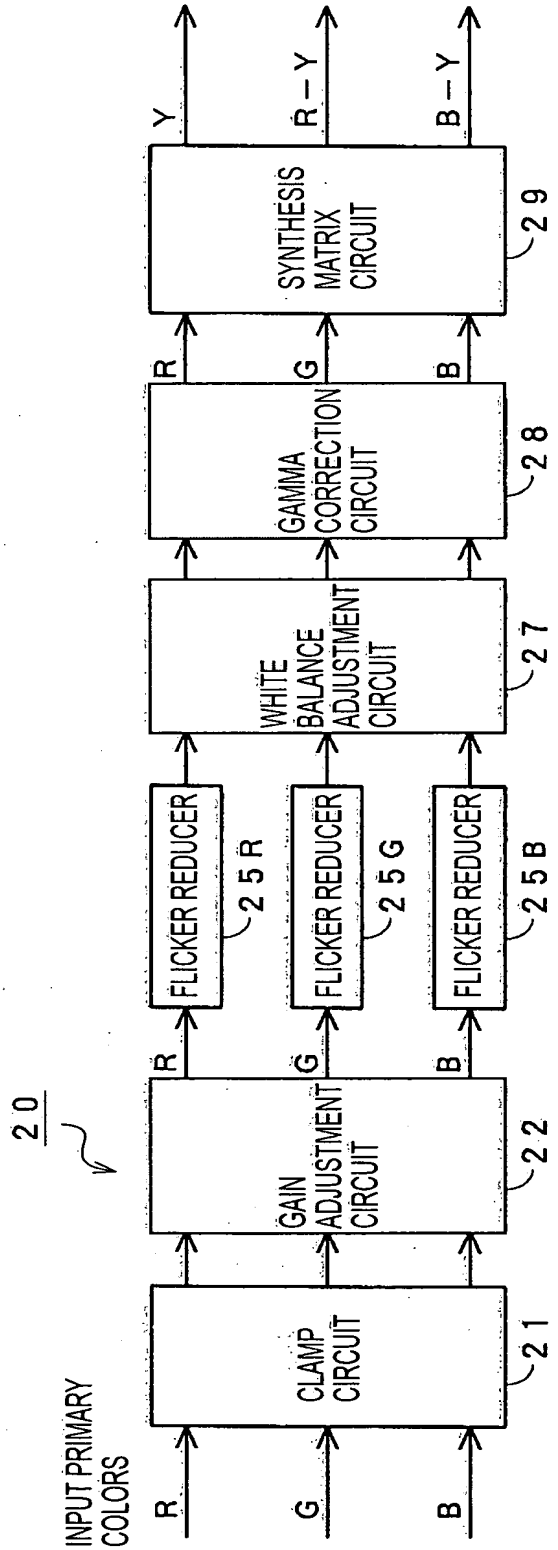

INPUT PRIMARY COLORS
R
G
B
20
CLAMP CIRCUIT
21
GAIN ADJUSTMENT CIRCUIT
22
FLICKER REDUCER
25R
FLICKER REDUCER
25G
FLICKER REDUCER
25B
WHITE BALANCE ADJUSTMENT CIRCUIT
27
GAMMA CORRECTION CIRCUIT
28
SYNTHESIS MATRIX CIRCUIT
29
Y
R – Y
B – Y

Fig.2

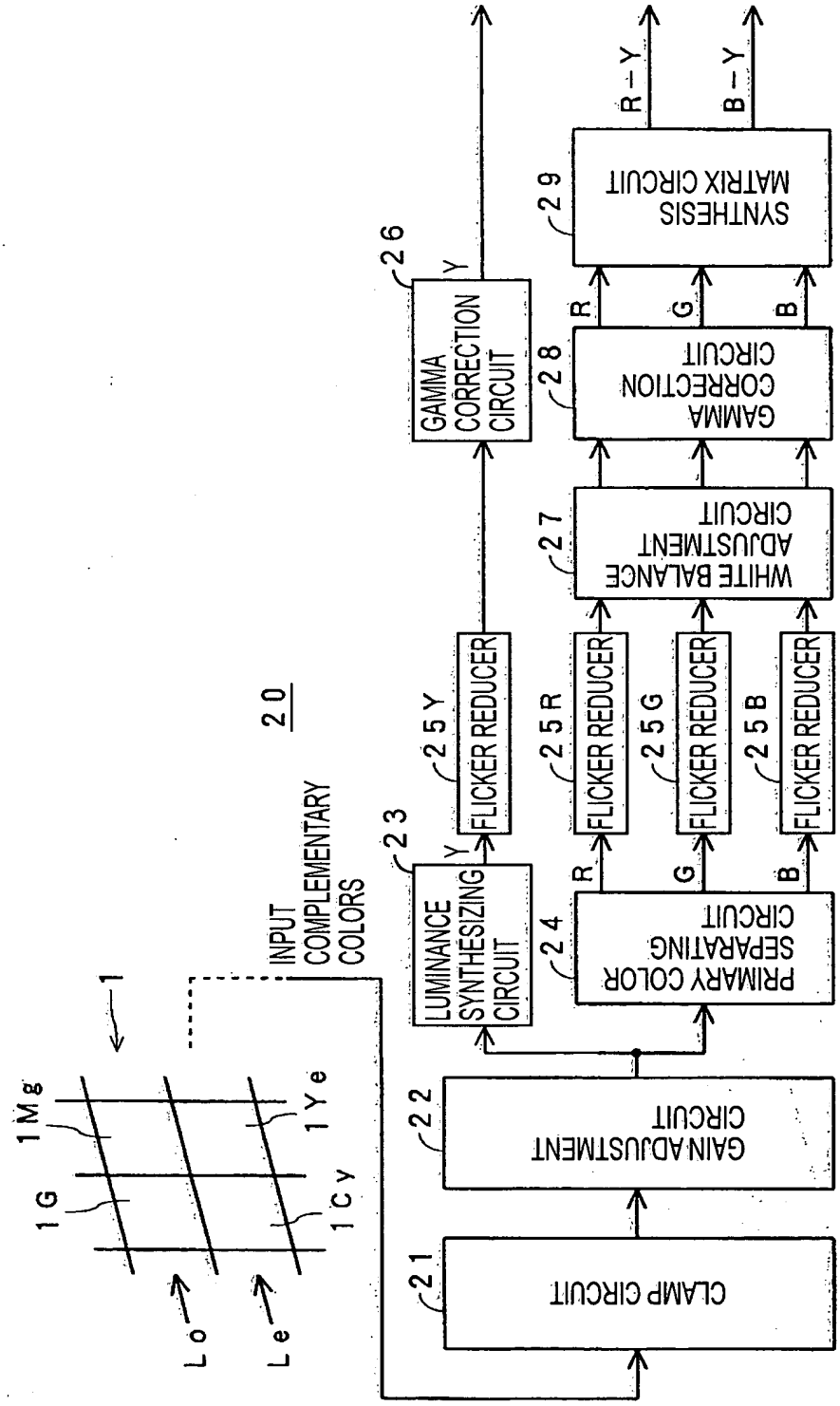

1
1Mg
1Ye
1G
1Cy
Lo
Le
INPUT COMPLEMENTARY COLORS
20
CLAMP CIRCUIT
21
GAIN ADJUSTMENT CIRCUIT
22
LUMINANCE SYNTHESIZING CIRCUIT
23
PRIMARY COLOR SEPARATING CIRCUIT
24
FLICKER REDUCER
25Y
FLICKER REDUCER
25R
FLICKER REDUCER
25G
FLICKER REDUCER
25B
WHITE BALANCE ADJUSTMENT CIRCUIT
27
GAMMA CORRECTION CIRCUIT
28
SYNTHESIS MATRIX CIRCUIT
29
GAMMA CORRECTION CIRCUIT
26
Y
R
G
B
R−Y
B−Y

Fig.3

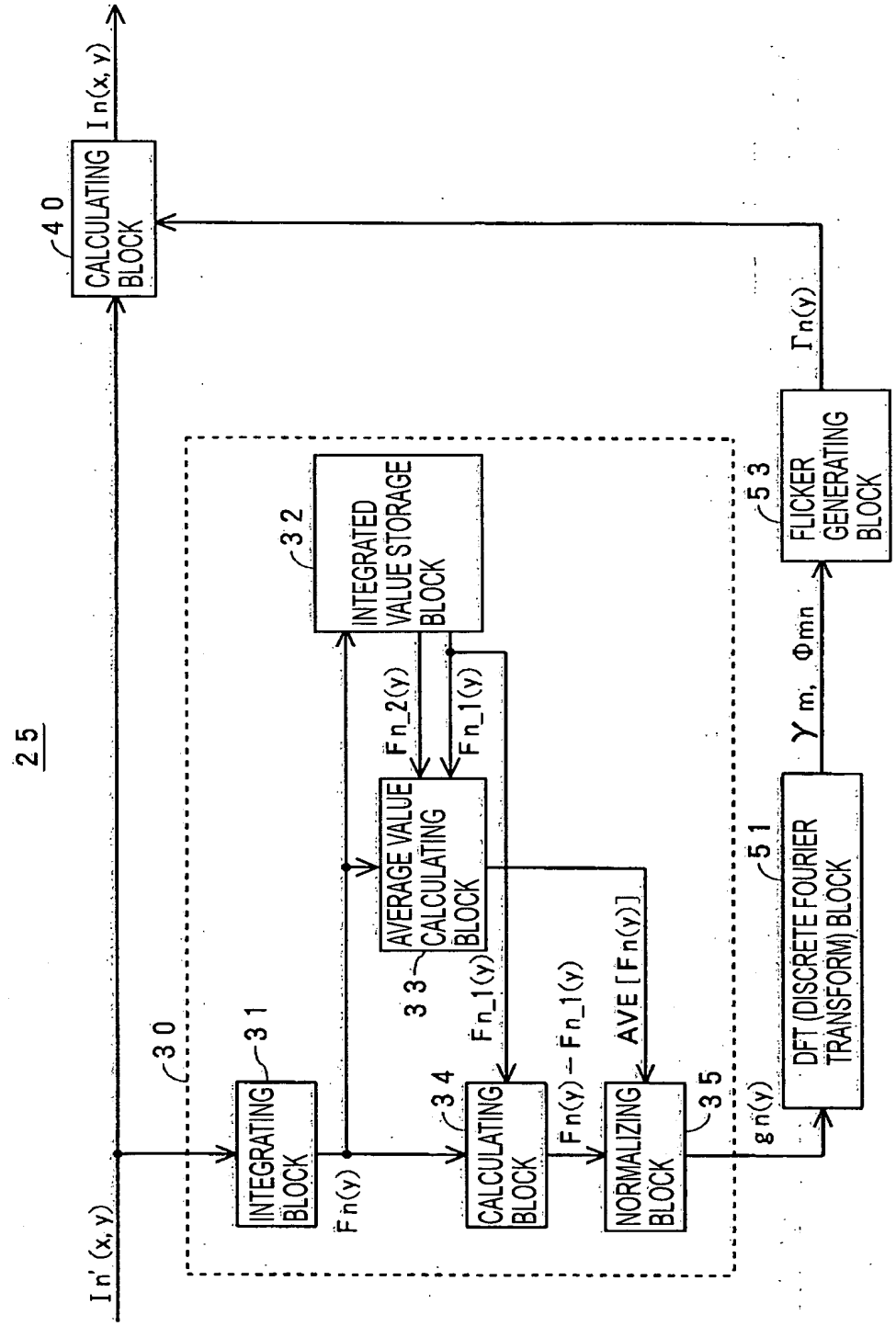

In(x, y)
40
CALCULATING BLOCK
Γn(y)
53
FLICKER GENERATING BLOCK
25
32
INTEGRATED VALUE STORAGE BLOCK
Fn_2(y)
Fn_1(y)
γm, Φmn
51
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
33
AVERAGE VALUE CALCULATING BLOCK
30
31
INTEGRATING BLOCK
34
CALCULATING BLOCK
35
NORMALIZING BLOCK
In' (x, y)
F̄n(y)
F̄n_1(y)
F̄n(y) − F̄n_1(y)
AVE [F̄n(y)]
gn(y)

Fig.4

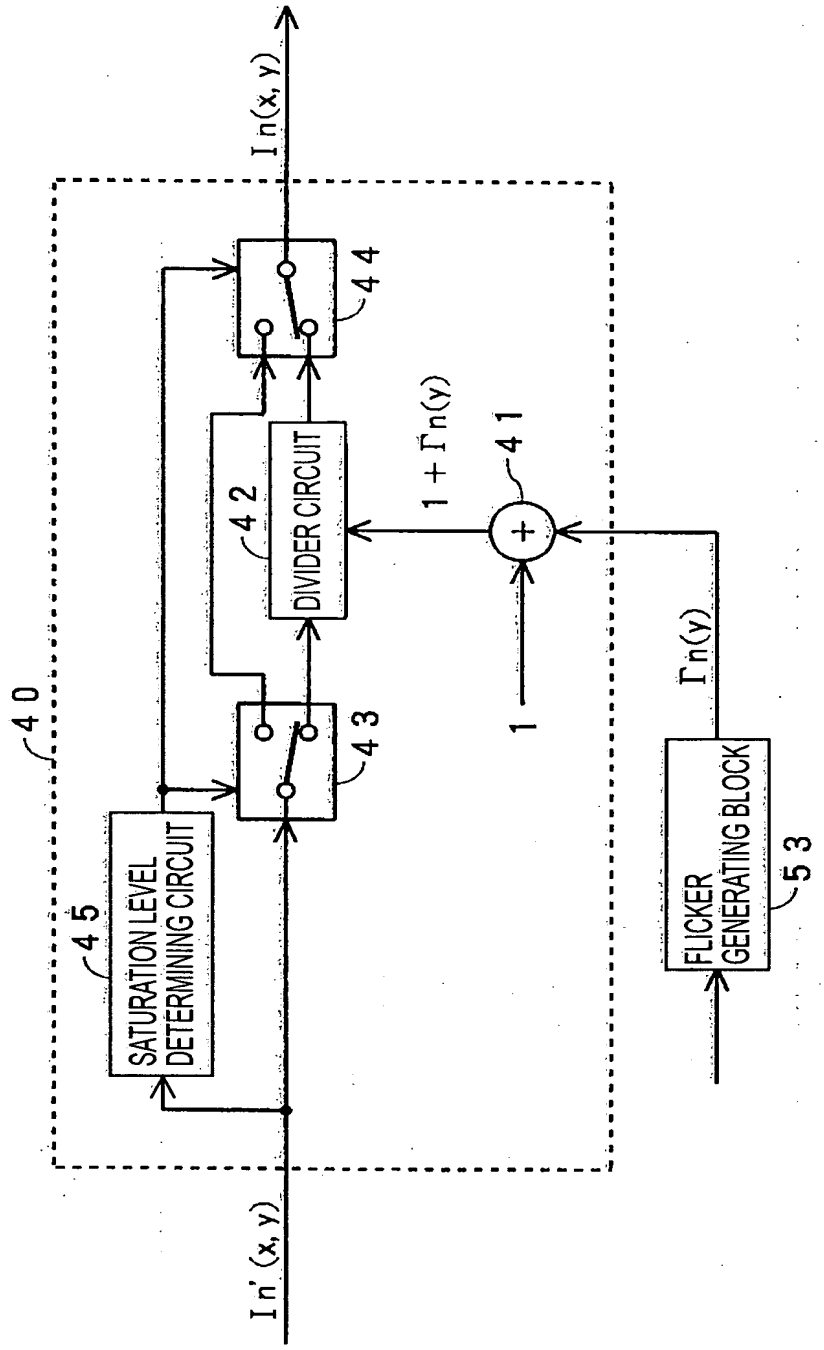

40
In(x, y)
In' (x, y)
44
43
42
DIVIDER CIRCUIT
41
1 + Γn(y)
1
Γn(y)
45
SATURATION LEVEL DETERMINING CIRCUIT
FLICKER GENERATING BLOCK
53

Fig.5

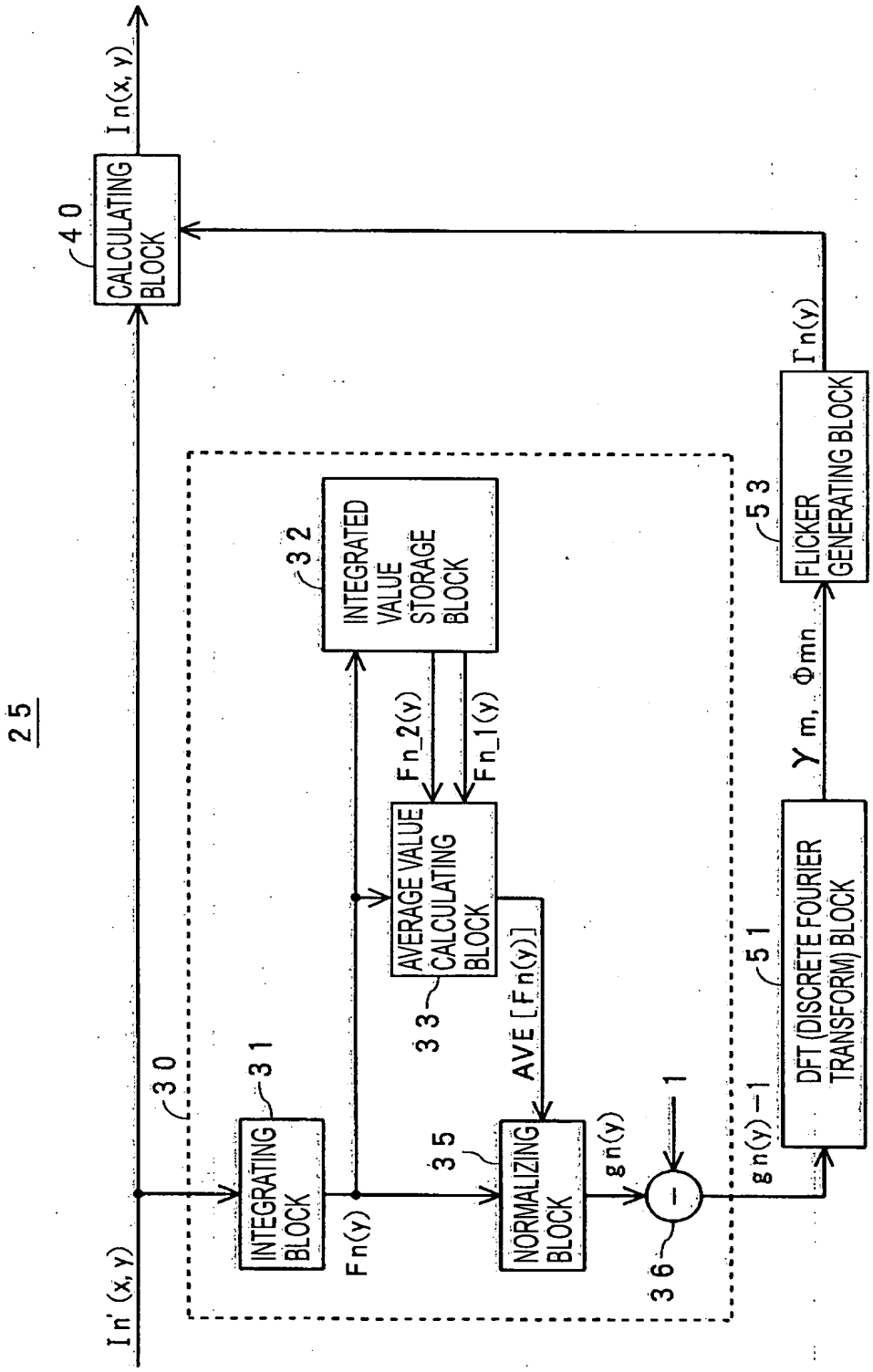

25
CALCULATING BLOCK
40
In(x, y)
In'(x, y)
30
INTEGRATING BLOCK
31
Fn(y)
INTEGRATED VALUE STORAGE BLOCK
32
Fn_2(y)
Fn_1(y)
AVERAGE VALUE CALCULATING BLOCK
33
AVE[Fn(y)]
NORMALIZING BLOCK
35
gn(y)
1
36
gn(y)−1
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
51
γm, Φmn
FLICKER GENERATING BLOCK
53
Γn(y)

Fig.6

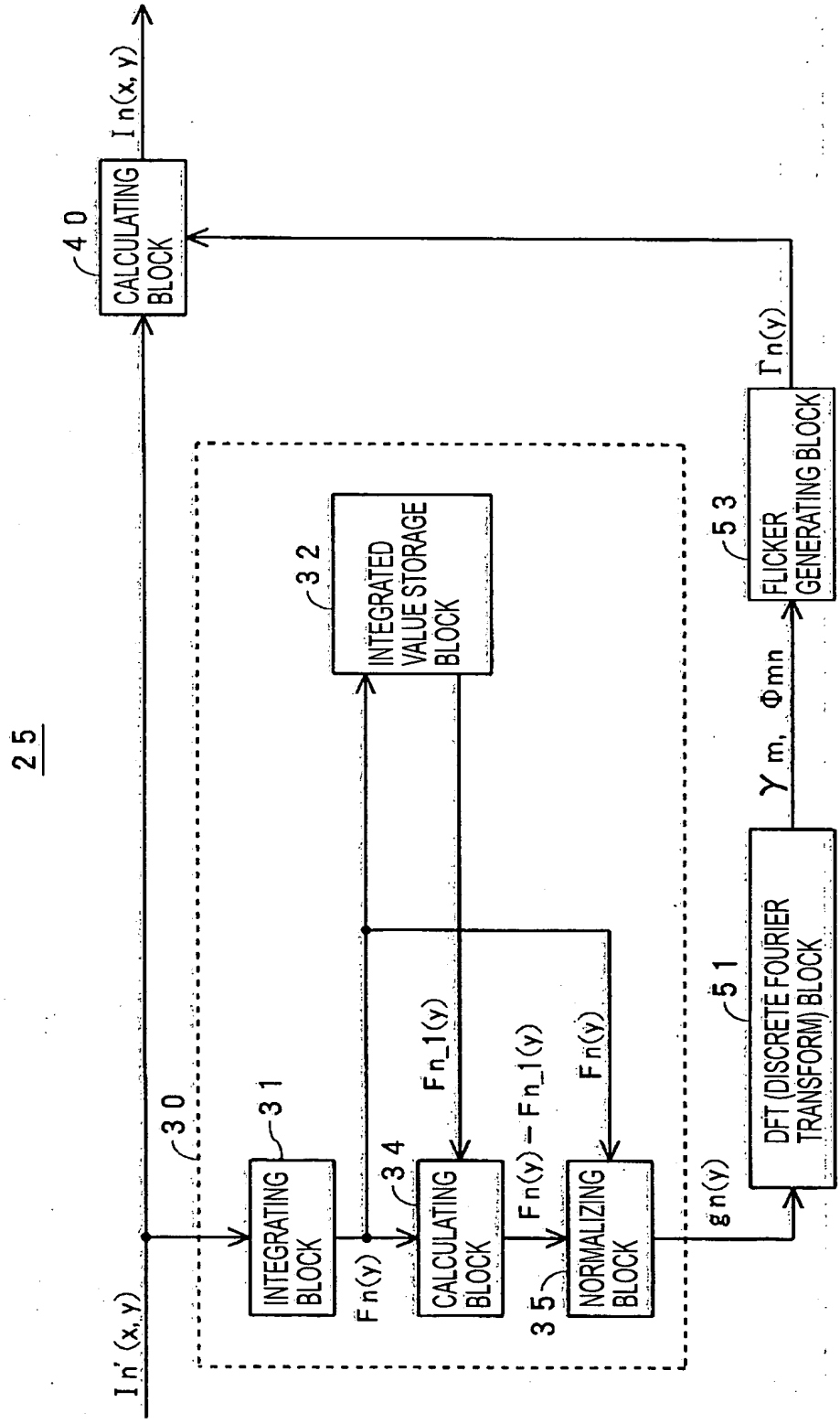

25
In'(x, y)
30
INTEGRATING BLOCK
31
Fn(y)
32
INTEGRATED VALUE STORAGE BLOCK
34
CALCULATING BLOCK
Fn_1(y)
Fn(y) − Fn_1(y)
35
NORMALIZING BLOCK
Fn(y)
gn(y)
51
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
γm, Φmn
53
FLICKER GENERATING BLOCK
Γn(y)
40
CALCULATING BLOCK
In(x, y)

Fig.7

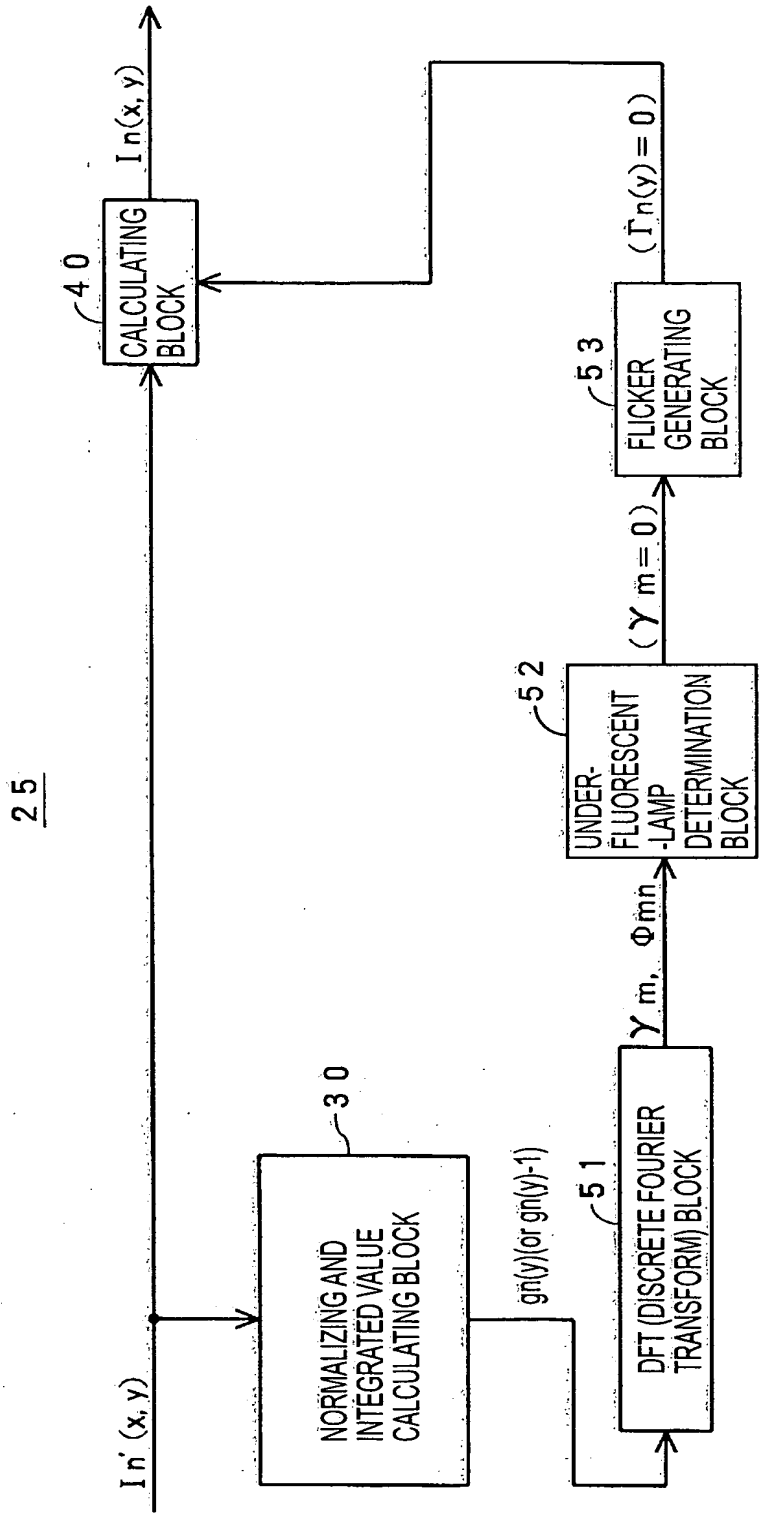

25
In' (x, y)
NORMALIZING AND INTEGRATED VALUE CALCULATING BLOCK
30
gn(y)(or gn(y)-1)
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
51
γ m, Φmn
UNDER-FLUORESCENT-LAMP DETERMINATION BLOCK
52
(γ m = 0)
FLICKER GENERATING BLOCK
53
(Γn(y) = 0)
CALCULATING BLOCK
40
In (x, y)

Fig.8

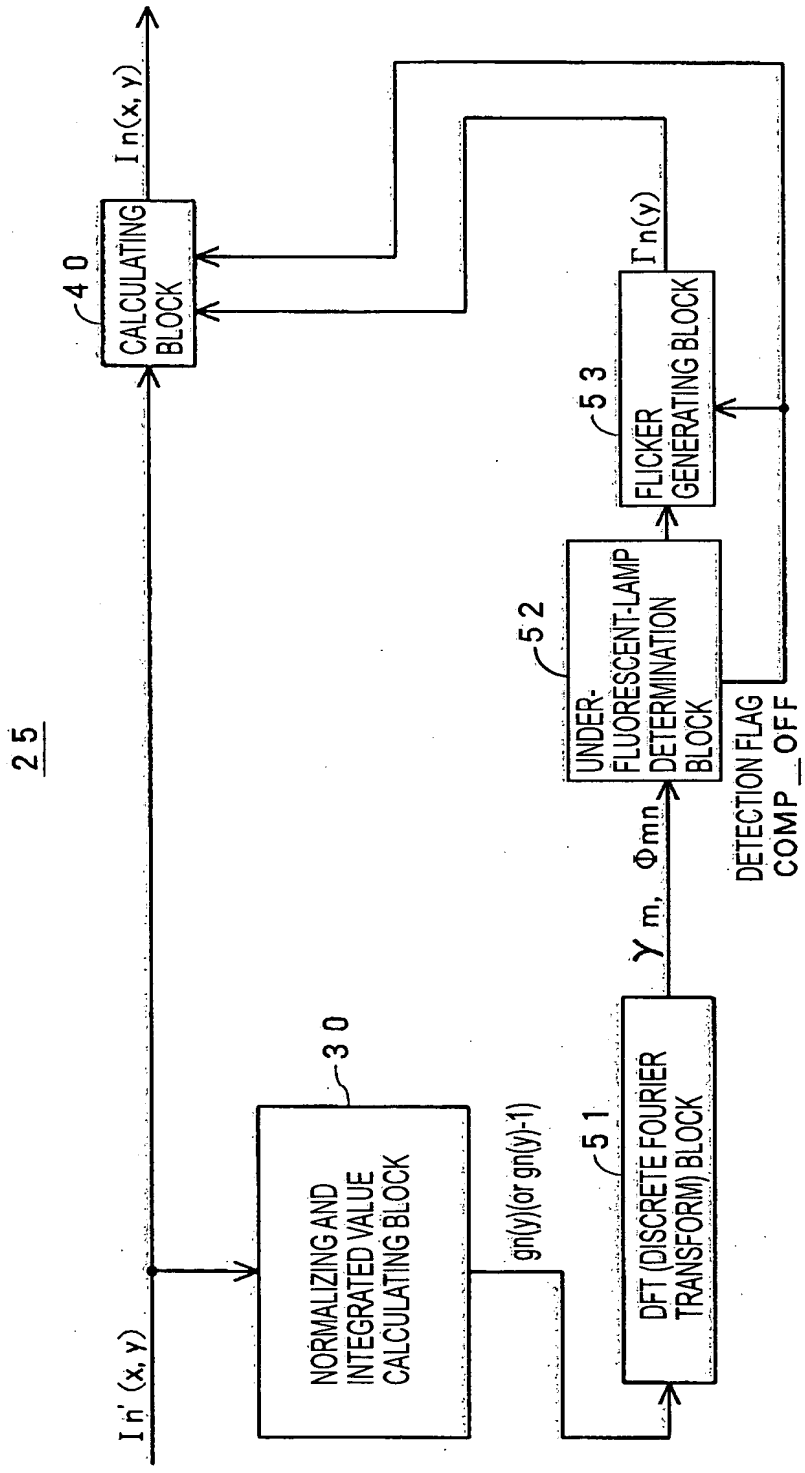

25
40
CALCULATING BLOCK
In(x, y)
In' (x, y)
30
NORMALIZING AND INTEGRATED VALUE CALCULATING BLOCK
gn(y)(or gn(y)-1)
51
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
γm, Φmn
52
UNDER-FLUORESCENT-LAMP DETERMINATION BLOCK
DETECTION FLAG COMP_OFF
53
FLICKER GENERATING BLOCK
Γn(y)

Fig.9

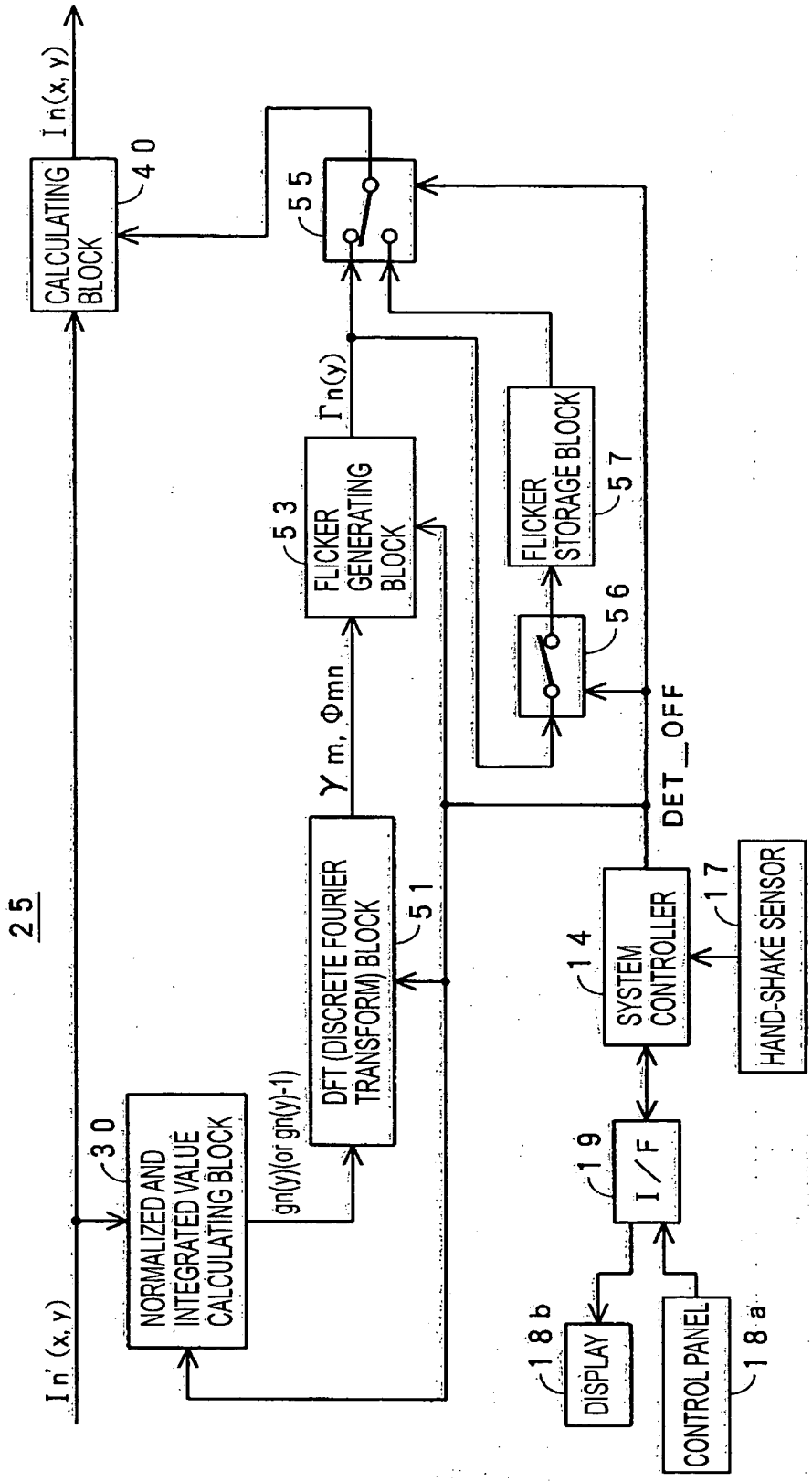

25
In'(x, y)
In(x, y)
CALCULATING BLOCK
40
NORMALIZED AND INTEGRATED VALUE CALCULATING BLOCK
30
gn(y)(or gn(y)-1)
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
51
γm, Φmn
FLICKER GENERATING BLOCK
53
Γn(y)
55
56
FLICKER STORAGE BLOCK
57
DET_OFF
SYSTEM CONTROLLER
14
HAND-SHAKE SENSOR
17
I/F
19
DISPLAY
18b
CONTROL PANEL
18a

Fig.10

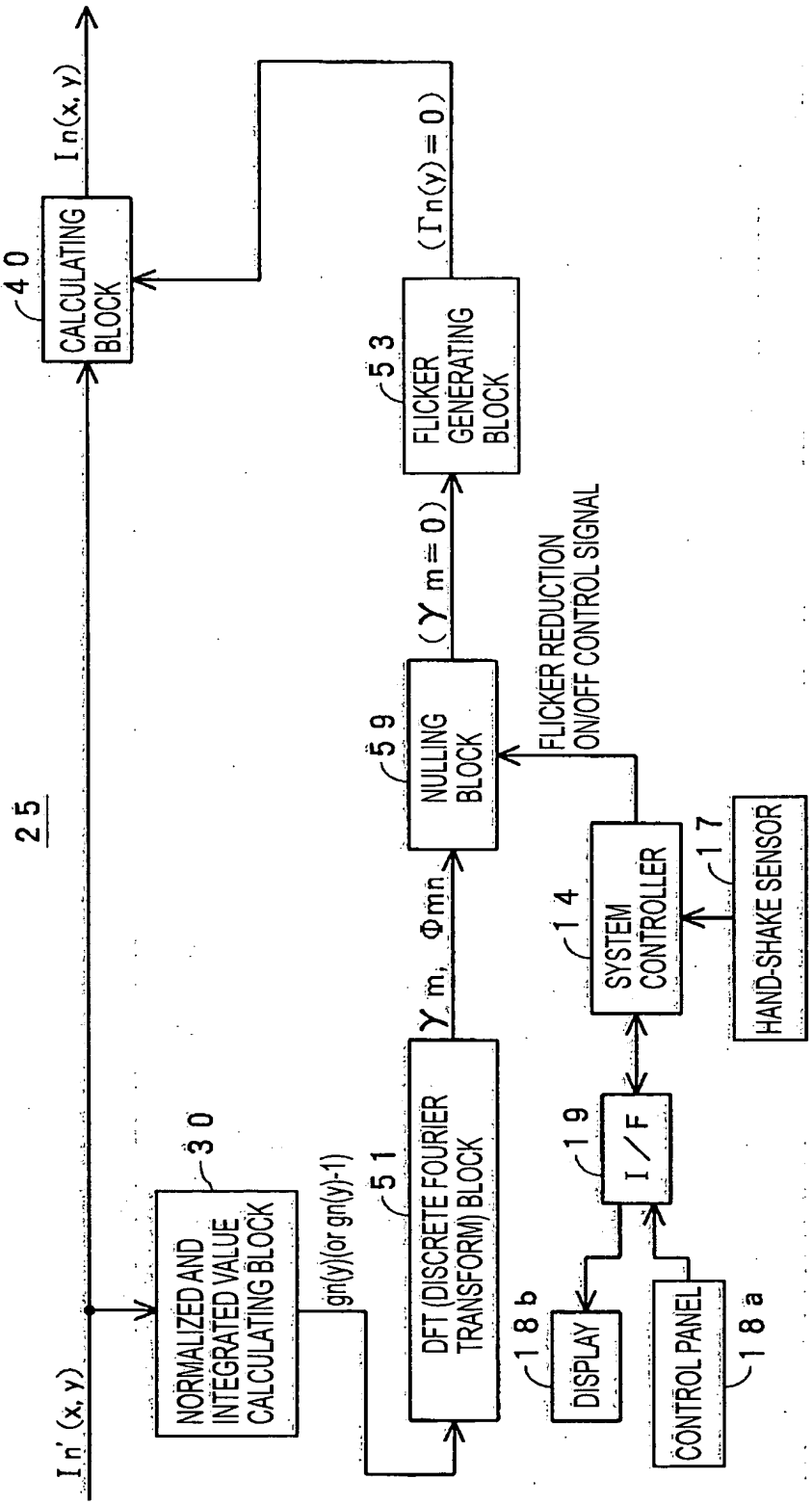

25
40
CALCULATING BLOCK
In(x, y)
In'(x, y)
30
NORMALIZED AND INTEGRATED VALUE CALCULATING BLOCK
gn(y)(or gn(y)-1)
51
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
γm, Φmn
59
NULLING BLOCK
(γm = 0)
53
FLICKER GENERATING BLOCK
(Γn(y) = 0)
FLICKER REDUCTION ON/OFF CONTROL SIGNAL
14
SYSTEM CONTROLLER
17
HAND-SHAKE SENSOR
19
I/F
18b
DISPLAY
18a
CONTROL PANEL

Fig.11

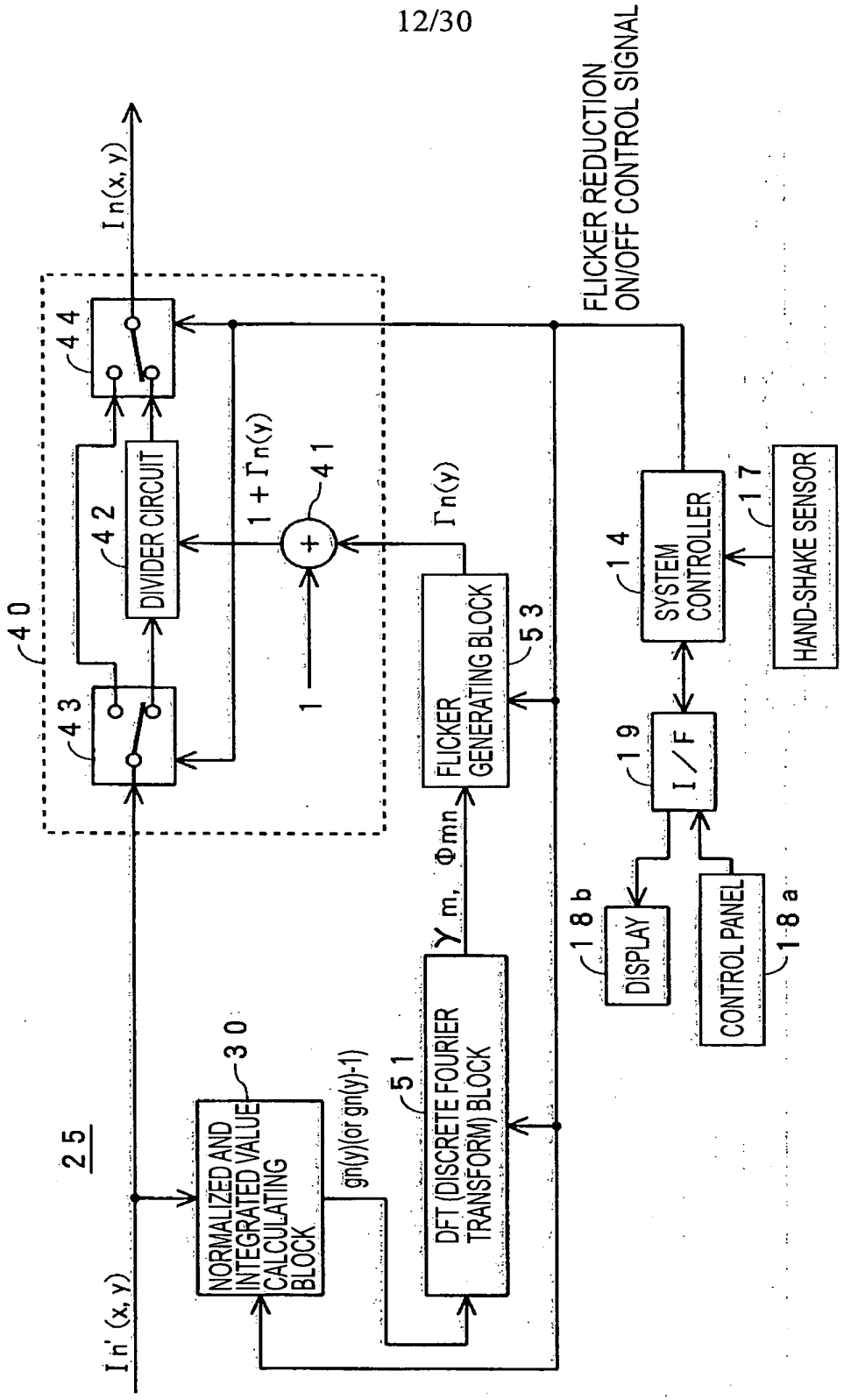

In(x, y)
FLICKER REDUCTION ON/OFF CONTROL SIGNAL
44
42
DIVIDER CIRCUIT
1 + Γn(y)
41
Γn(y)
40
43
1
FLICKER GENERATING BLOCK
53
14
SYSTEM CONTROLLER
17
HAND-SHAKE SENSOR
19
I/F
γm, Φmn
18b
DISPLAY
CONTROL PANEL
18a
25
30
NORMALIZED AND INTEGRATED VALUE CALCULATING BLOCK
gn(y)(or gn(y)-1)
51
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
In' (x, y)

Fig.12

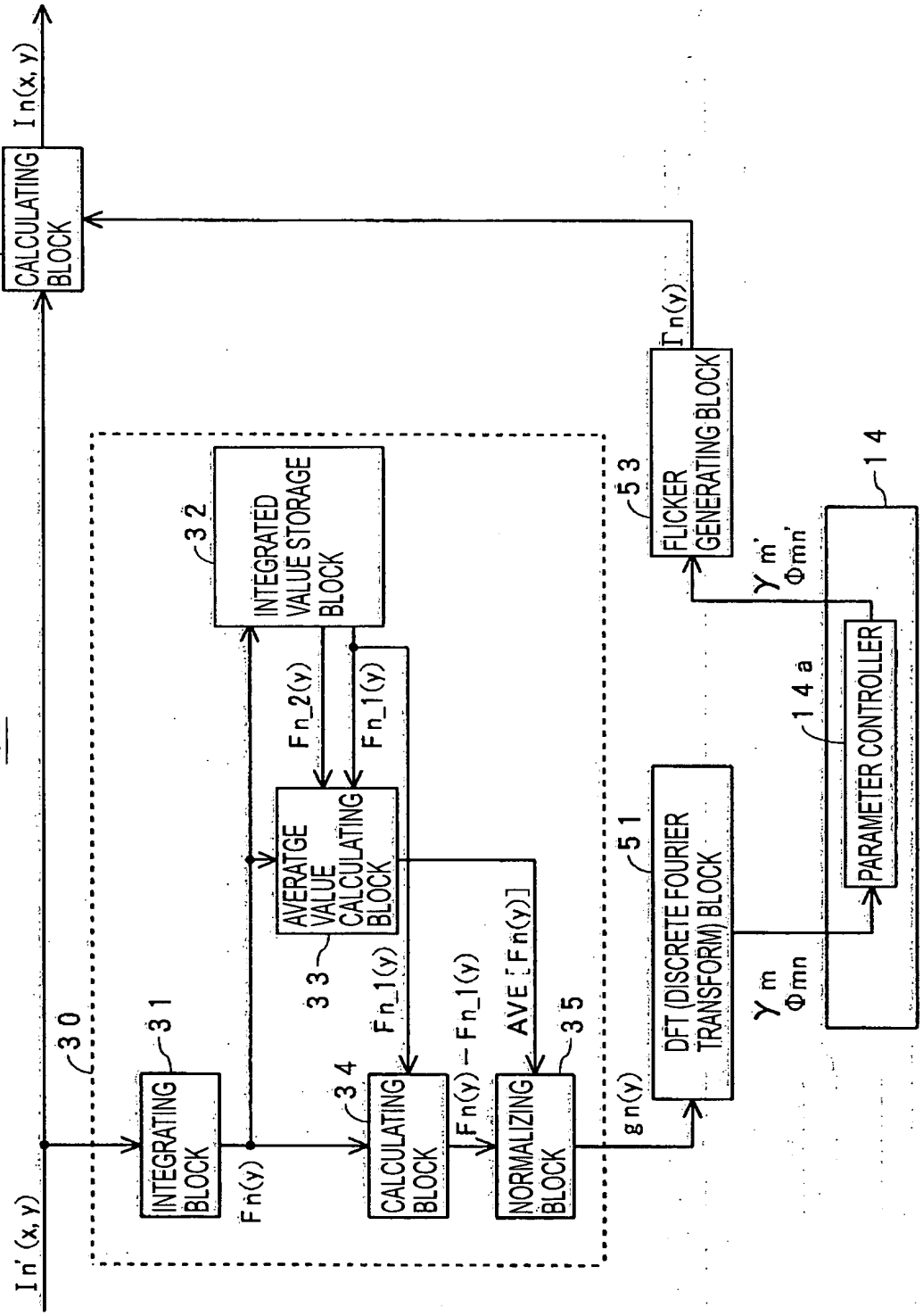

In(x, y)
40
CALCULATING BLOCK
25
30
In' (x, y)
INTEGRATING BLOCK
31
Fn(y)
32
INTEGRATED VALUE STORAGE BLOCK
Fn_2(y)
Fn_1(y)
33
AVERATGE VALUE CALCULATING BLOCK
Fn_1(y)
34
CALCULATING BLOCK
Fn(y) − Fn_1(y)
AVE [Fn(y)]
35
NORMALIZING BLOCK
gn(y)
51
DFT (DISCRETE FOURIER TRANSFORM) BLOCK
γm
Φmn
53
FLICKER GENERATING BLOCK
Γn(y)
γm'
Φmn'
14
14a
PARAMETER CONTROLLER

Fig.13

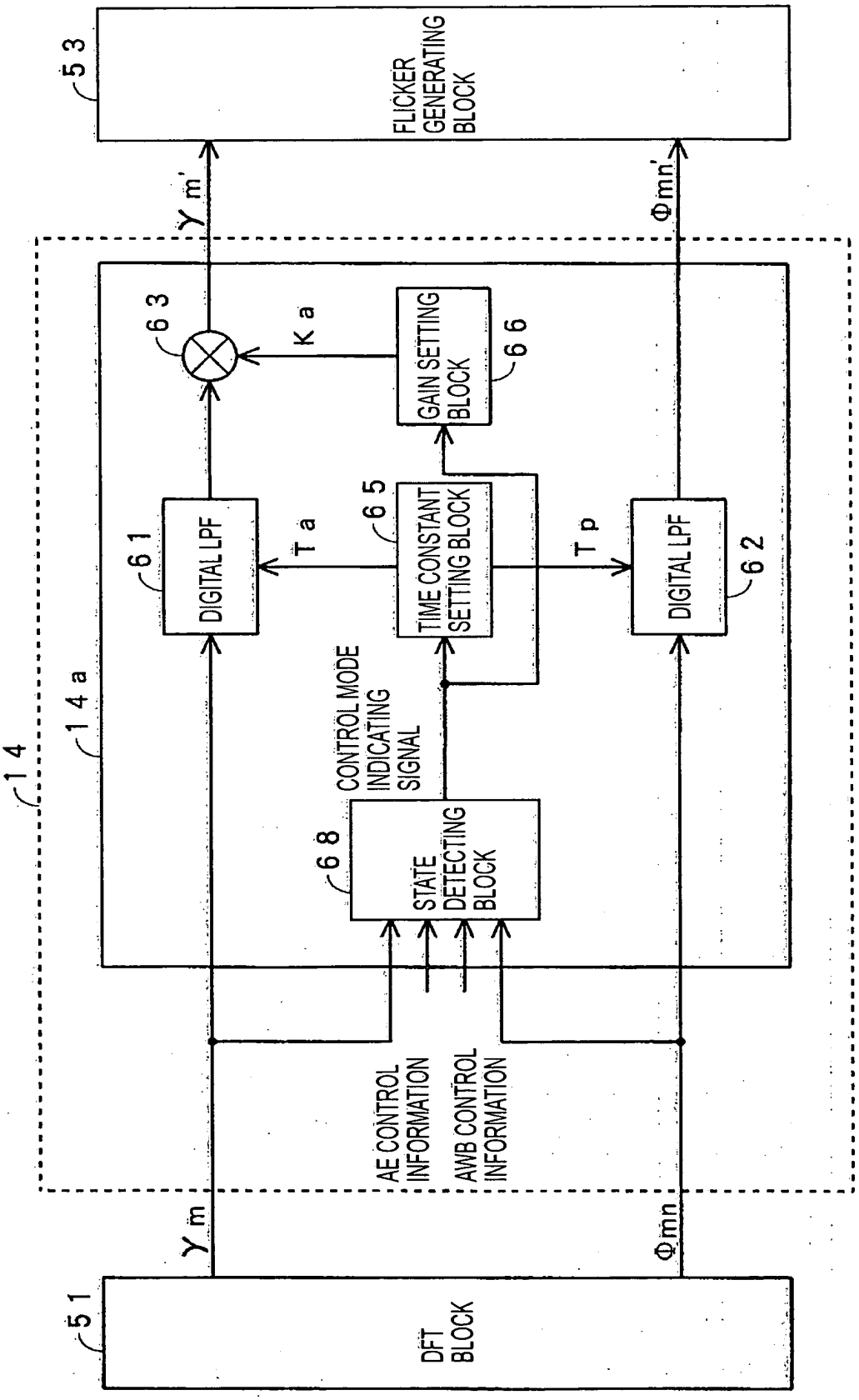

FLICKER GENERATING BLOCK
53
γm'
Φmn'
63
Ka
GAIN SETTING BLOCK
66
DIGITAL LPF
61
Ta
TIME CONSTANT SETTING BLOCK
65
Tp
DIGITAL LPF
62
14
14a
CONTROL MODE INDICATING SIGNAL
68
STATE DETECTING BLOCK
AE CONTROL INFORMATION
AWB CONTROL INFORMATION
γm
Φmn
DFT BLOCK
51

Fig.14

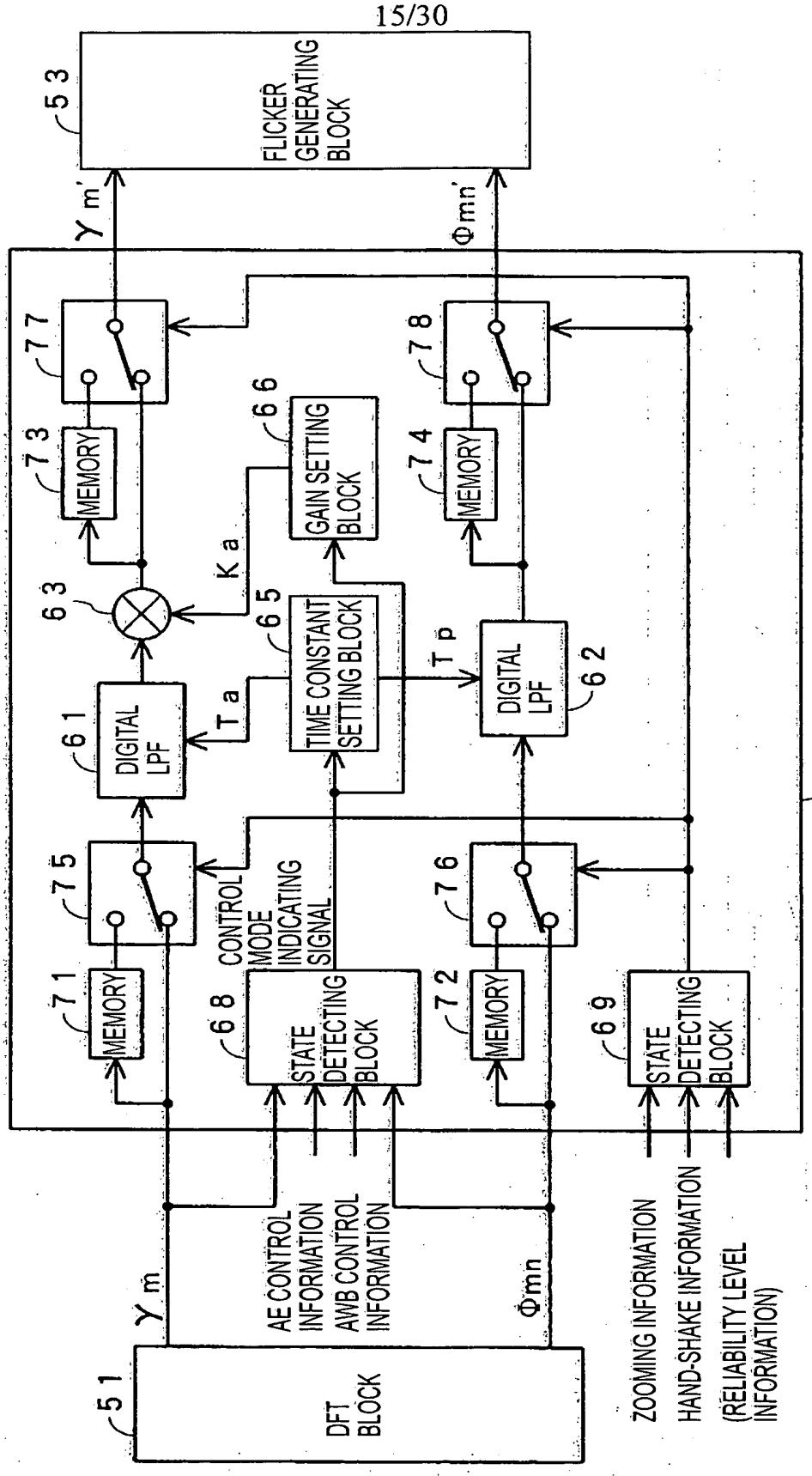

FLICKER GENERATING BLOCK
53
γm'
Φmn'
77
78
MEMORY
73
MEMORY
74
66
GAIN SETTING BLOCK
Ka
63
65
TIME CONSTANT SETTING BLOCK
Ta
Tp
DIGITAL LPF
61
DIGITAL LPF
62
75
76
CONTROL MODE INDICATING SIGNAL
14a
71
MEMORY
68
STATE DETECTING BLOCK
72
MEMORY
69
STATE DETECTING BLOCK
γm
Φmn
AE CONTROL INFORMATION
AWB CONTROL INFORMATION
ZOOMING INFORMATION
HAND-SHAKE INFORMATION
(RELIABILITY LEVEL INFORMATION)
51
DFT BLOCK

Fig.15

STATE	DETERMINATION CRITERIA	CONTROL MODE
STABLE STATE UNDER LIGHT OF FLUORESCENT LAMP (REGULAR FLICKER)	· THROUGHOUT A PLURALITY OF PAST FIELDS γm :ENERALLY CONSTANT Φmn :GENERALLY CONSTANT EVERY CONSTANT NUMBER OF PERIODS AE CONTROL INFORMATION :SCREEN LIGHTNESS VARYING EVERY CONSTANT NUMBER OF PERIODS AWB CONTROL INFORMATION :DETERMINED ALMOST AS BEING UNDER "LIGHT OF FLUORESCENT LAMP"	MODE A
STABLE STATE UNDER LIGHT OF NON-FLUORESCENT LAMP (FLICKERLESS)	· THROUGHOUT A PLURALITY OF PAST FIELDS γm :RANDOMLY VARYING IN THE VICINITY OF ZERO (NOISE COMPONENT ONLY) Φmn :RANDOMLY VARYING AE CONTROL INFORMATION :NO PERIODICITY IN SCREEN LIGHTNESS AWB CONTROL INFORMATION :DETERMINED ALMOST AS BEING UNDER "LIGHT OF NON-FLUORE SCENT LAMP"	MODE B

Fig.16

Fig.17A

$$I_n'(x,y) = [1 + \Gamma_n(y)] * I_n(x,y) \quad \cdots (1)$$

WHERE

$$\Gamma_n(y) = \sum_{m=1}^{\infty} \gamma_m * \cos[m * (2\pi / \lambda_o) * y + \Phi_{mn}]$$

$$= \sum_{m=1}^{\infty} \gamma_m * \cos(m * \omega_o * y + \Phi_{mn}) \quad \cdots (2)$$

$$\Delta\Phi_{mn} = (-2\pi/3) * m \quad \cdots (3)$$

Fig.17B

$$F_n(y) = \sum_x I_n'(x,y) = \sum_x \{[1 + \Gamma_n(y)] * I_n(x,y)\}$$

$$= \sum_x I_n(x,y) + \Gamma_n(y) \sum_x I_n(x,y)$$

$$= \alpha_n(y) + \alpha_n(y) * \Gamma_n(y) \quad \cdots (4)$$

WHERE

$$\alpha_n(y) = \sum_x I_n(x,y) \quad \cdots (5)$$

Fig.18A

$$AVE[Fn(y)] = (1/3)\sum_{k=0}^{2} Fn\_k(y)$$

$$= (1/3)\left\{\sum_{k=0}^{2} \alpha n\_k(y) + \alpha n\_k(y) * \Gamma n\_k(y)\right\}$$

$$= (1/3)\sum_{k=0}^{2} \alpha n\_k(y) + (1/3)\sum_{k=0}^{2} \alpha n\_k(y) * \Gamma n\_k(y)$$

$$= \alpha n(y) + (1/3) * \alpha n(y)\sum_{k=0}^{2} \Gamma n\_k(y)$$

$$= \alpha n(y) \quad \cdots(6)$$

WHERE

$$\alpha n(y) \cong \alpha n\_1(y) \cong \alpha n\_2(y) \quad \cdots(7)$$

Fig.18B

$$Fn(y) - Fn\_1(y)$$

$$= \{\alpha n(y) + \alpha n(y) * \Gamma n(y)\} - \{\alpha n\_1(y) + \alpha n\_1(y) * \Gamma n\_1(y)\}$$

$$= \alpha n(y) * \{\Gamma n(y) - \Gamma n\_1(y)\}$$

$$= \alpha n(y)\sum_{m=1}^{\infty} \gamma m * \{\cos(m * \omega o * y + \Phi mn) - \cos(m * \omega o * y + \Phi mn\_1)\}$$

$$\cdots(8)$$

Fig.19A

$$gn(y)=\{Fn(y)-Fn\_1(y)\}/AVE[Fn(y)]$$

$$=\sum_{m=1}^{\infty}\gamma\, m*\{\cos(m*\omega o*y+\Phi mn)-\cos(m*\omega o*y+\Phi mn\_1)\}$$

$$=\sum_{m=1}^{\infty}(-2)\,\gamma\, m\{\sin[m*\omega o*y+(\Phi mn+\Phi mn\_1)/2]*\sin[(\Phi mn-\Phi mn\_1)/2]\} \quad \cdots(9)$$

Fig.19B

$$gn(y)=\sum_{m=1}^{\infty}(-2)\,\gamma\, m*\sin(m*\omega o*y+\Phi mn+m*\pi/3)*\sin(-m*\pi/3)$$

$$=\sum_{m=1}^{\infty}2*\gamma\, m*\cos(m*\omega o*y+\Phi mn+m*\pi/3-\pi/2)*\sin(m*\pi/3)$$

$$=\sum_{m=1}^{\infty}2*\gamma\, m*\sin(m*\pi/3)*\cos(m*\omega o*y+\Phi mn+m*\pi/3-\pi/2)$$

$$=\sum_{m=1}^{\infty}|Am|*\cos(m*\omega o*y+\theta m) \quad \cdots(10)$$

WHERE

$$|Am|=2*\gamma\, m*\sin(m*\pi/3) \quad \cdots(11a)$$

$$\theta m=\Phi mn+m*\pi/3-\pi/2 \quad \cdots(11b)$$

Fig.20A

$$\gamma m = |Am| / [2 * \sin(m * \pi / 3)] \quad \cdots (12a)$$

$$\Phi mn = \theta m - m * \pi / 3 + \pi / 2 \quad \cdots (12b)$$

Fig.20B

$$DFT[gn(y)] = Gn(m) = \sum_{i=0}^{L-1} gn(i) * W^{m*i} \quad \cdots (13)$$

WHERE

$$W = \exp[-j * 2\pi / L] \quad \cdots (14)$$

Fig.20C

$$|Am| = 2 * |Gn(m)| / L \quad \cdots (15a)$$

$$\theta m = \tan^{-1}\{Im[Gn(m)] / Re[Gn(m)]\} \quad \cdots (15b)$$

WHERE

Im[Gn(m)] :IMAGINARY PART
Re[Gn(m)] :REAL PART

Fig.20D

$$\gamma m = |Gn(m)| / [L * \sin(m * \pi / 3)] \quad \cdots (16a)$$

$$\Phi mn = \tan^{-1}\{Im[Gn(m)] / Re[Gn(m)]\} - m * \pi / 3 + \pi / 2 \quad \cdots (16b)$$

Fig.20E

$$In(x,y) = In'(x,y) / [1 + \Gamma n(y)] \quad \cdots (17)$$

Fig.21A

$$gn(y)=Fn(y)/AVE[Fn(y)]$$
$$=1+\sum_{m=1}^{\infty}\gamma m*\cos(m*\omega o*y+\Phi mn) \quad \cdots (18)$$

Fig.21B

$$gn(y)-1=\sum_{m=1}^{\infty}\gamma m*\cos(m*\omega o*y+\Phi mn)$$
$$=\sum_{m=1}^{\infty}|Am|*\cos(m*\omega o*y+\theta m) \quad \cdots (19)$$

Fig.21C

$$\gamma m=2*|Gn(m)|/L \quad \cdots (20a)$$

$$\Phi mn=\tan^{-1}\{Im[Gn(m)]/Re[Gn(m)]\} \quad \cdots (20b)$$

WHERE

Im[Gn(m)] : IMAGINARY PART
Re[Gn(m)] : REAL PART

Fig.22A

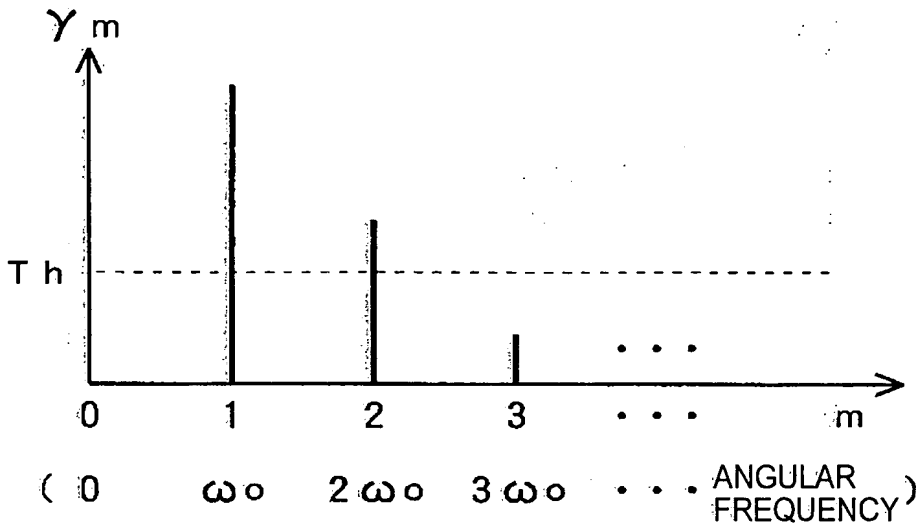
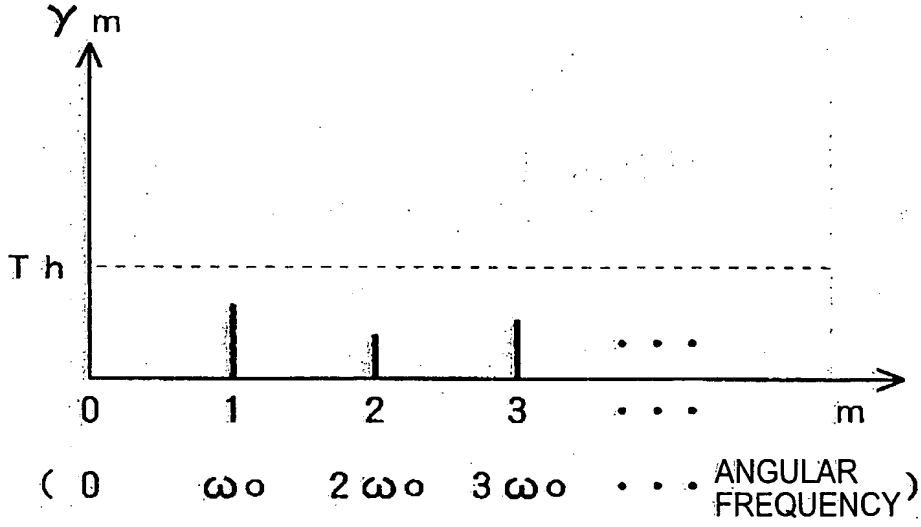


Fig.22B



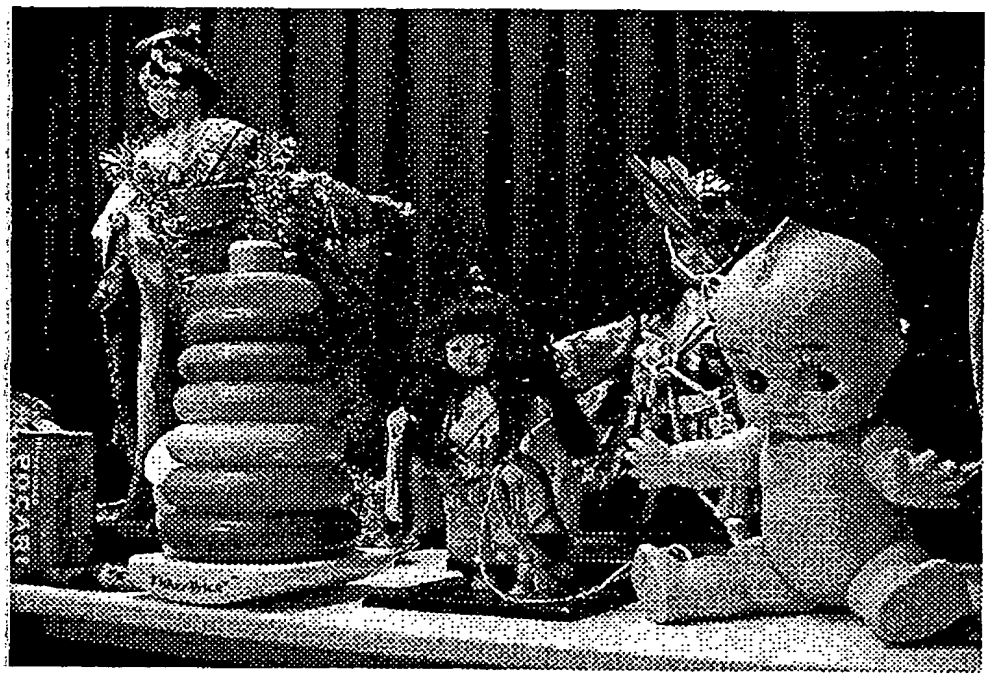


Fig.23

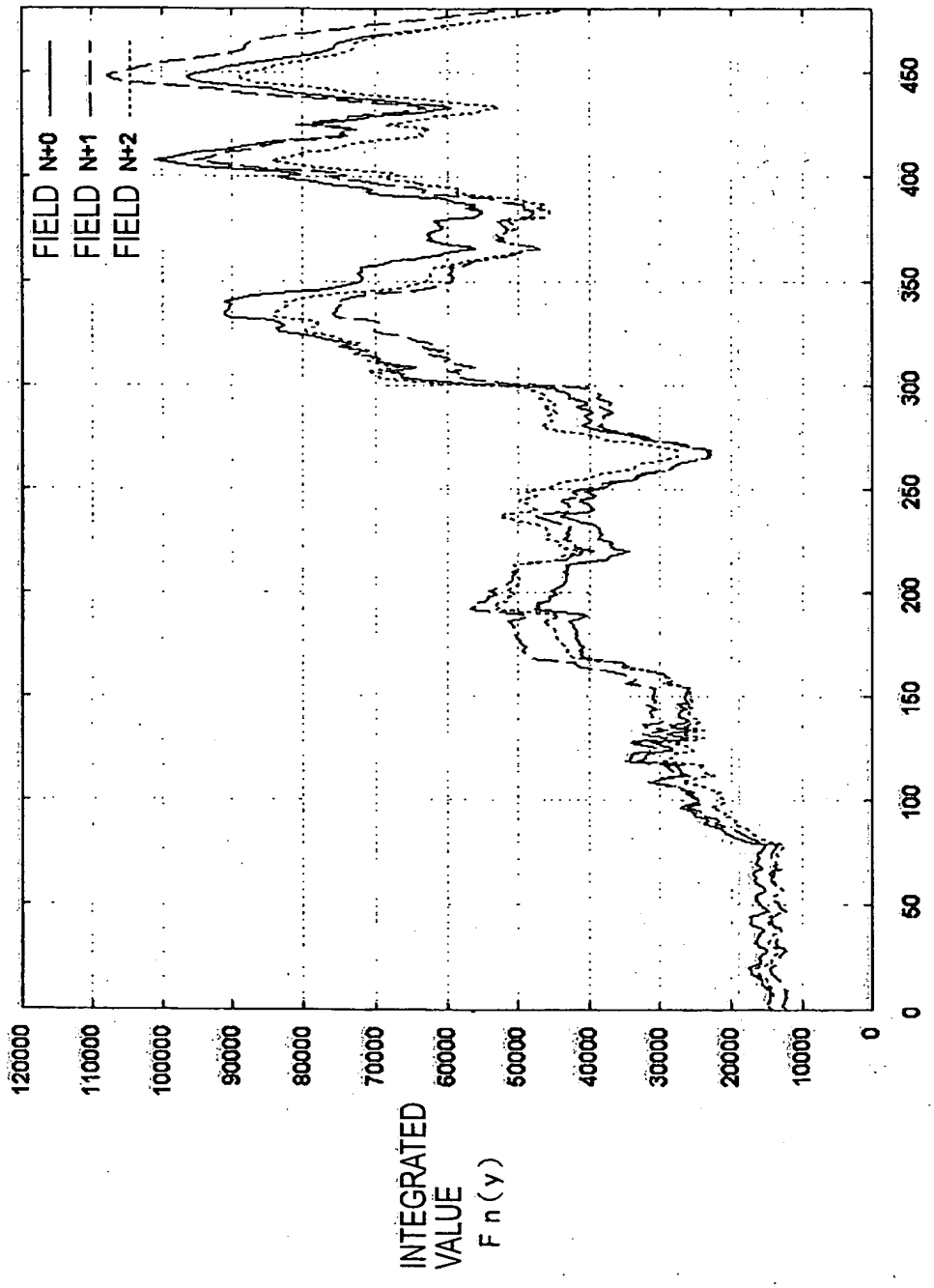

FIELD N+0
FIELD N+1
FIELD N+2
INTEGRATED VALUE
Fn(y)
LINE NUMBER
120000
110000
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
0
50
100
150
200
250
300
350
400
450

Fig.24

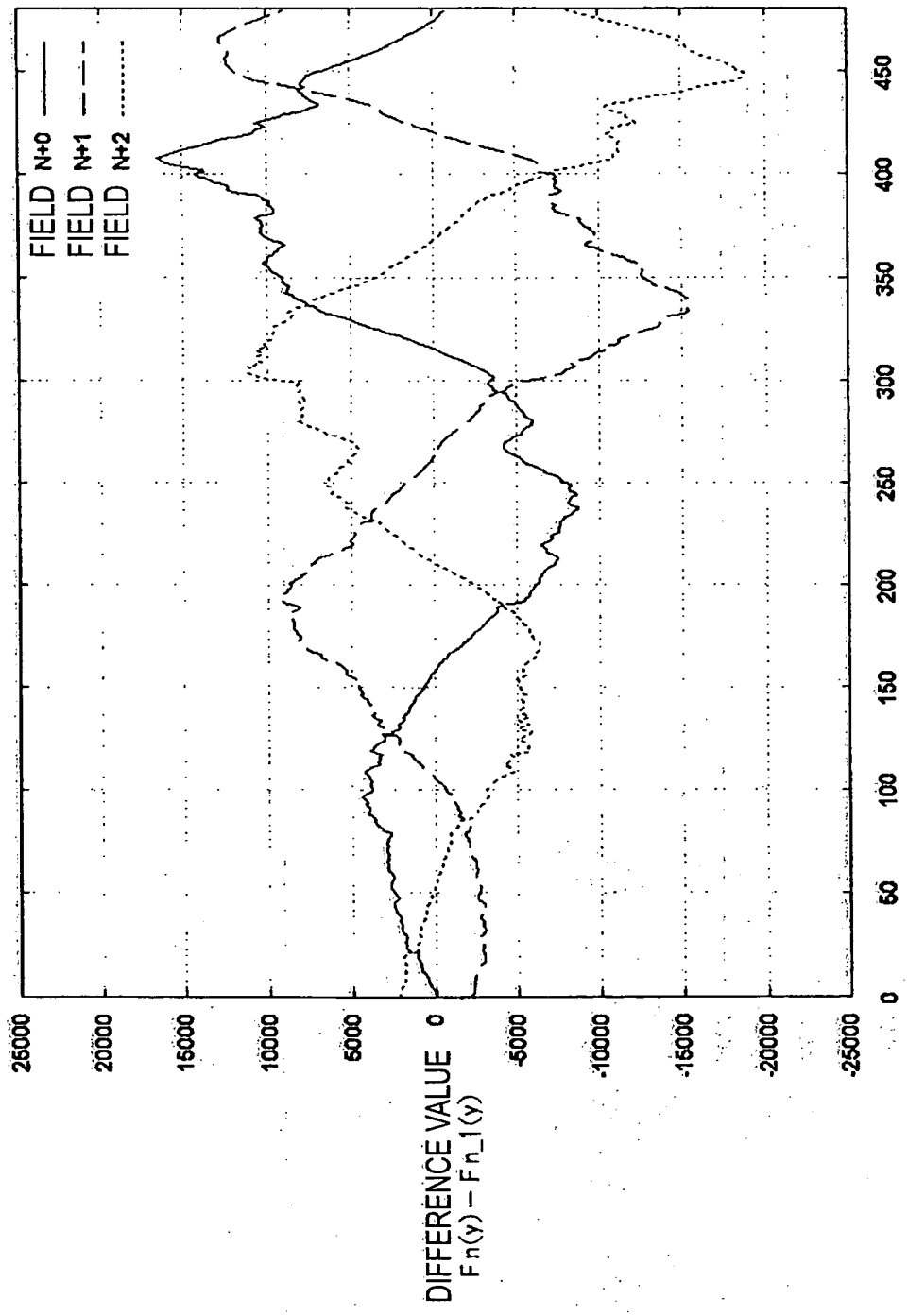

FIELD N+0
FIELD N+1
FIELD N+2
DIFFERENCE VALUE
Fn(y) – Fn_1(y)
LINE NUMBER
25000
20000
15000
10000
5000
0
-5000
-10000
-15000
-20000
-25000
0
50
100
150
200
250
300
350
400
450

Fig.25

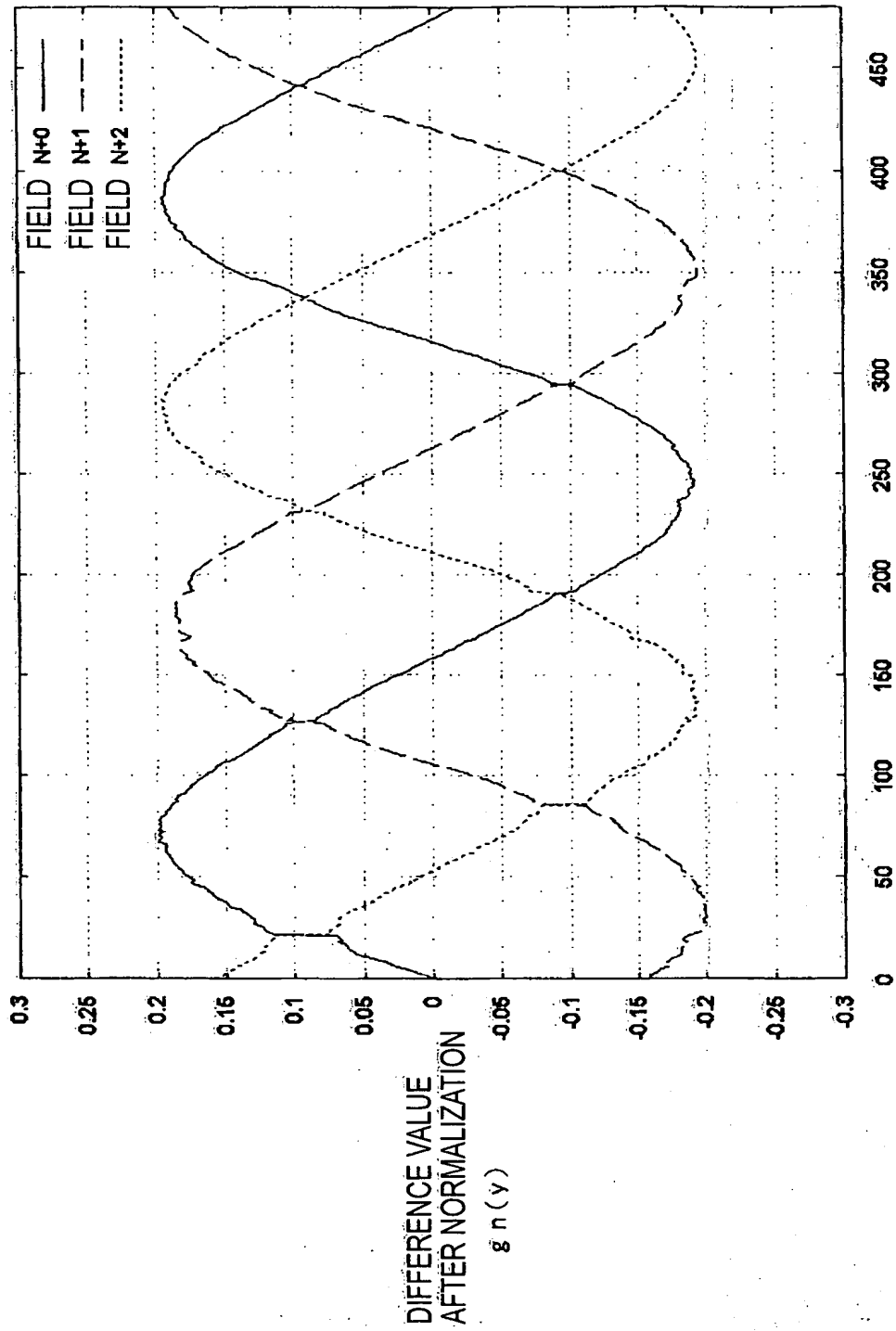

FIELD N+0
FIELD N+1
FIELD N+2
DIFFERENCE VALUE
AFTER NORMALIZATION
g n (y)
LINE NUMBER
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
-0.3
0
50
100
150
200
250
300
350
400
450

Fig.26

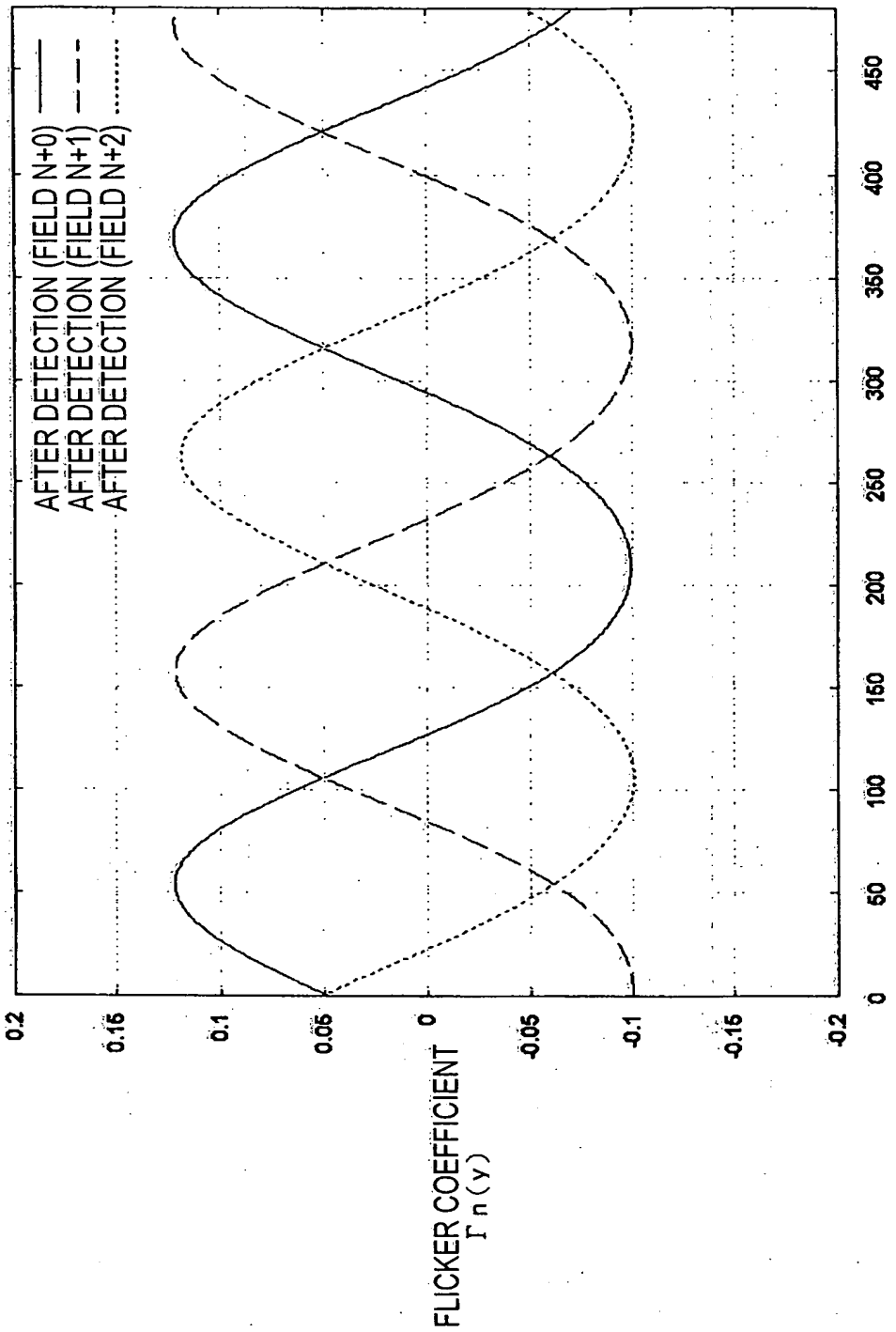

AFTER DETECTION (FIELD N+0)
AFTER DETECTION (FIELD N+1)
AFTER DETECTION (FIELD N+2)
FLICKER COEFFICIENT
Γ n (y)
LINE NUMBER
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
0
50
100
150
200
250
300
350
400
450

Fig.27

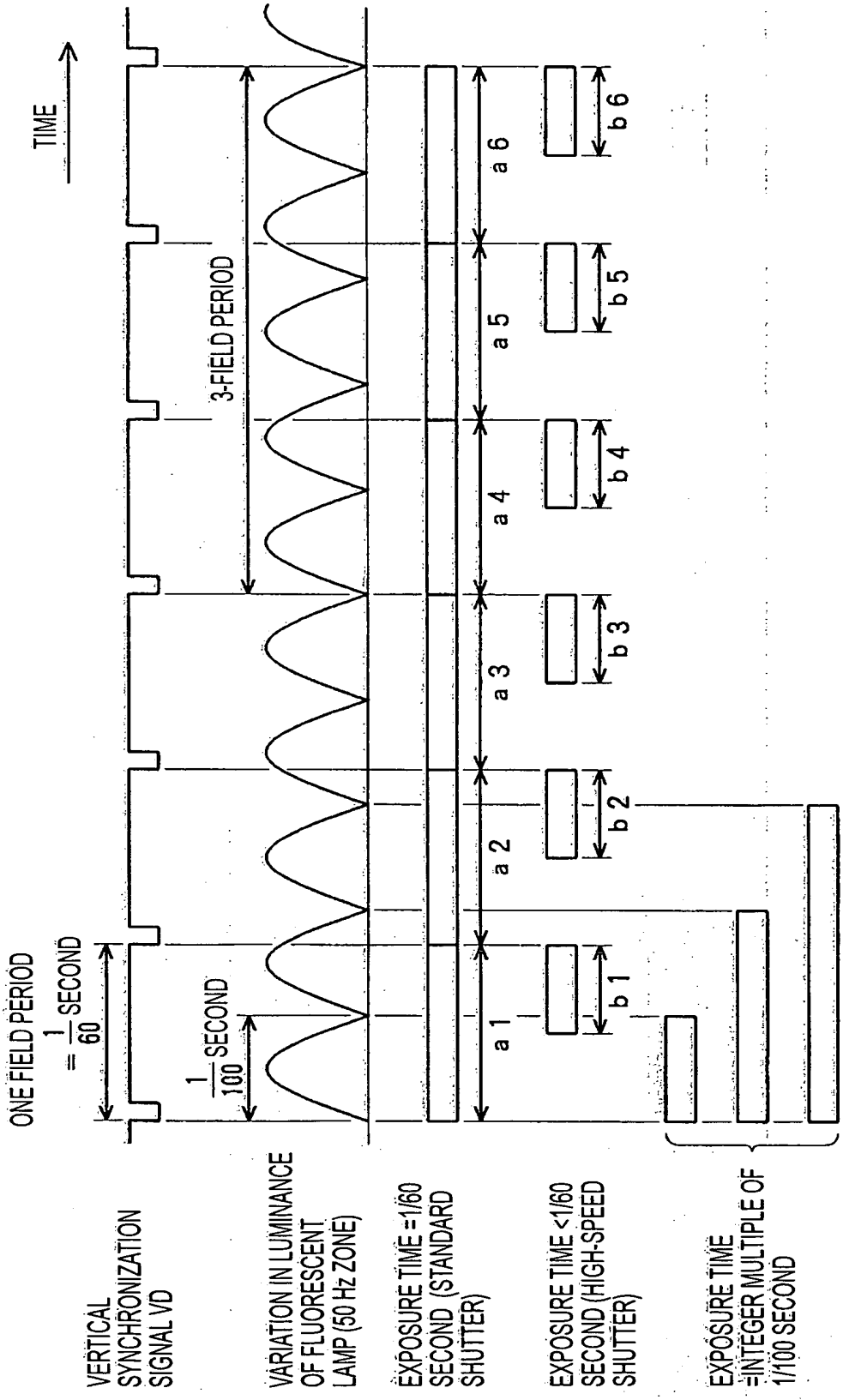

TIME
ONE FIELD PERIOD
= 1/60 SECOND
1/100 SECOND
3-FIELD PERIOD
VERTICAL SYNCHRONIZATION SIGNAL VD
VARIATION IN LUMINANCE OF FLUORESCENT LAMP (50 Hz ZONE)
EXPOSURE TIME =1/60 SECOND (STANDARD SHUTTER)
EXPOSURE TIME <1/60 SECOND (HIGH-SPEED SHUTTER)
EXPOSURE TIME =INTEGER MULTIPLE OF 1/100 SECOND
a 1
a 2
a 3
a 4
a 5
a 6
b 1
b 2
b 3
b 4
b 5
b 6

Fig.28

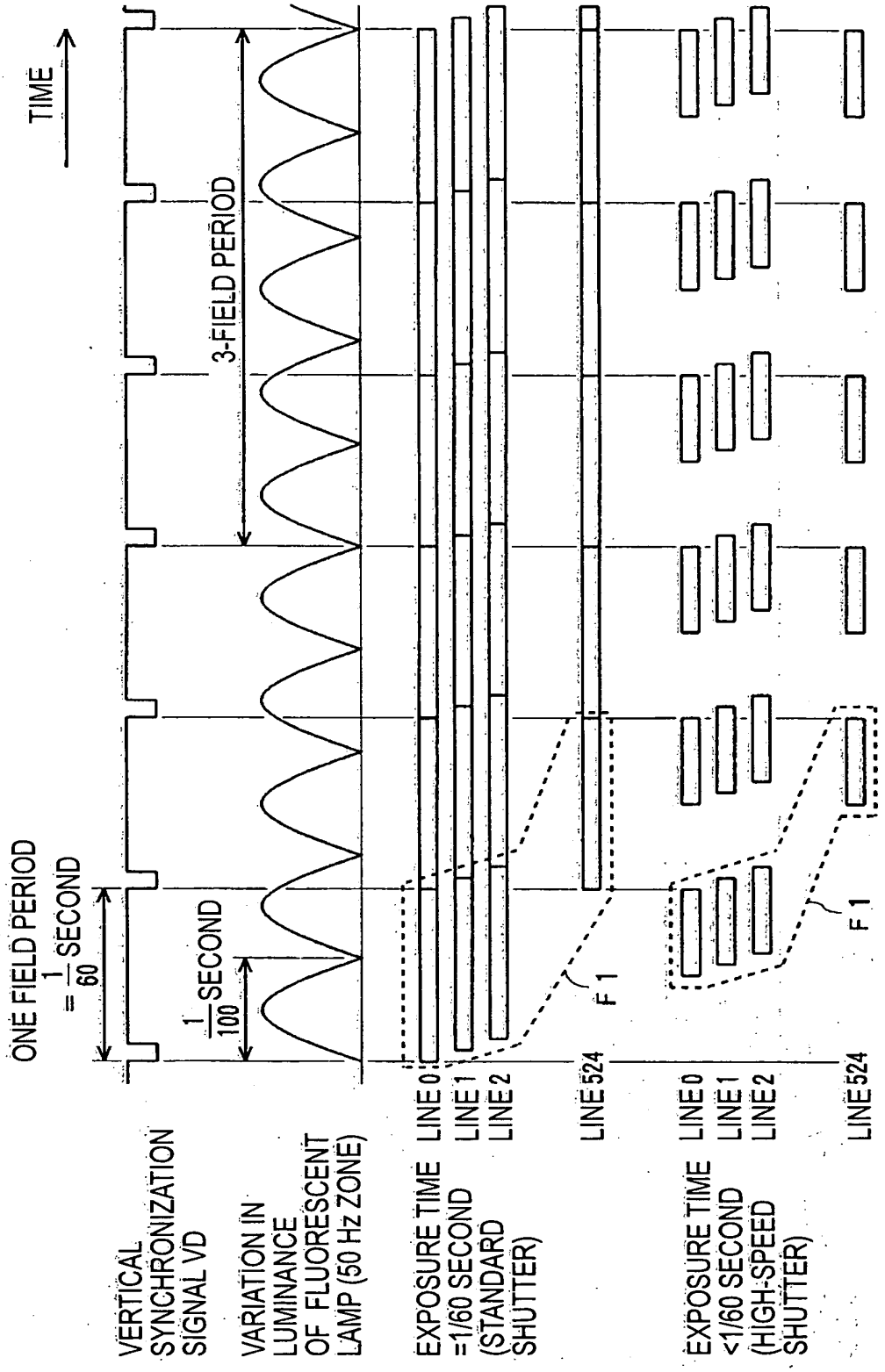

TIME
ONE FIELD PERIOD
= 1/60 SECOND
1/100 SECOND
3-FIELD PERIOD
VERTICAL SYNCHRONIZATION SIGNAL VD
VARIATION IN LUMINANCE OF FLUORESCENT LAMP (50 Hz ZONE)
EXPOSURE TIME =1/60 SECOND (STANDARD SHUTTER)
LINE 0
LINE 1
LINE 2
LINE 524
F 1
EXPOSURE TIME <1/60 SECOND (HIGH-SPEED SHUTTER)
LINE 0
LINE 1
LINE 2
LINE 524
F 1

Fig.29

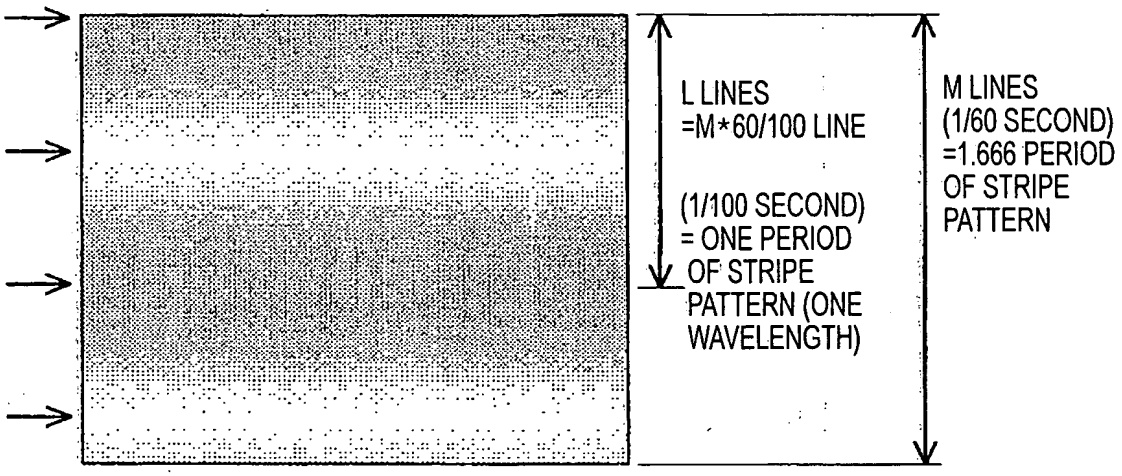

L LINES
=M*60/100 LINE
(1/100 SECOND)
= ONE PERIOD
OF STRIPE
PATTERN (ONE
WAVELENGTH)
M LINES
(1/60 SECOND)
=1.666 PERIOD
OF STRIPE
PATTERN

Fig.30

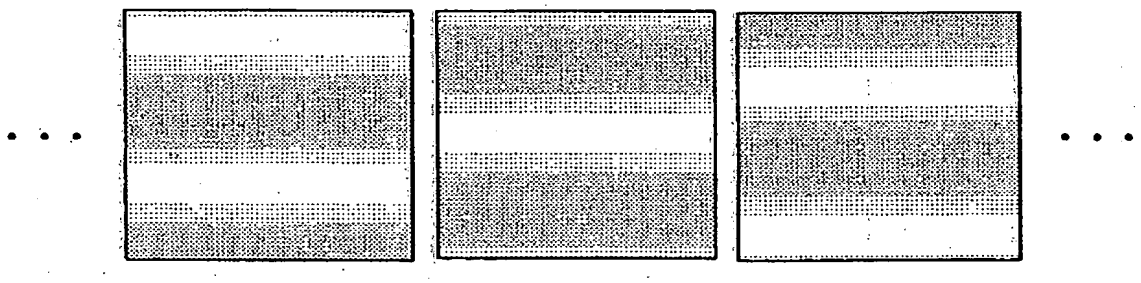


Fig.31